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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/524,805	04/05/2005	Alfred Ramirez	HSE-060US	1023

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EXAMINER	
MAYES, MELVIN C	
ART UNIT	**PAPER NUMBER**
1734	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/23/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/524,805	RAMIREZ ET AL.	
	Examiner	Art Unit	
	Melvin Curtis Mayes	1734	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-27 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-27 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 02 February 2005 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 7/8/05.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

(1)

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

(2)

Claims 1, 2, 4, 6, 13-17, 21-23 and 25-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Minh et al. 5,290,642.

Minh et al. 5,290,642 discloses a method of making a solid oxide fuel cell core (component of an electrochemical converter) comprising: casting a tape from a slurry of lanthanum chromite powder for an interconnect; casting a tape from a slurry of zirconia powder for an electrolyte; laminating the tapes with cathode and anode tapes; cutting the tapes

into laminates; sintering to partially densify; laminating the sintered and densified components to form a stacked assembly; and heat treating to sinter and fully densify the assembly using a compressive force during sintering and densifying to promote contact and interbonding, the heat treating to sinter and densify being at temperature of 1000-1400°C. The interconnect and electrolyte layers are thin (0.002-0.005 cm) (0.0008-0.002 inches) (thus layers with thickness less than 0.03 inches) while the cathode and anode layers have thickness of 0.002-0.05 cm (0.0008-0.02 inches) (thus component with thickness encompassing the range of 0.01-0.03 inches). The tape for the interconnect is planar (flat) while other tapes are corrugated (col. 6-8).

(3)

Claim 1, 4, 5, 13-17, 21-23 and 25-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Minh et al. US 5,256,499.

Minh et al. 5,256,499 discloses a method of making a solid oxide fuel cell core (component of an electrochemical converter) comprising: casting a tape from a slurry of lanthanum chromite powder for an interconnect; casting a tape from a slurry of zirconia powder for an electrolyte; cutting and pressing the tapes into the desired shaped elements; laminating the elements; sintering to partially densify; laminating the sintered and densified components to form a stacked assembly; and heat treating to sinter and fully densify the assembly using a compressive force during sintering and densifying to promote contact and interbonding, the heat treating to sinter and densify being at temperature of 1000-1400°C. The interconnect and electrolyte layers are thin (0.002-0.005 cm) (thus layers with thickness less than 0.03 inches) while the cathode and anode layers have thickness of 0.002-0.05 cm (0.008-0.02 in) (thus component with thickness encompassing the claimed range of 0.01-0.03 inches).

The tape for the interconnect is planar (flat) while other tapes are corrugated (col. 5-8).

(4)

Claims 1, 13, 16, 21, 22 and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Khandkar US 5,171,645.

Khandkar 5,171,645 discloses a method of making an electrolyte (component) of a fuel cell (electrochemical converter) comprising: layering tape caste materials of different compositions; pressing the tape cast layers together; and hot pressing at high temperature, such as 1300°C, and pressure of 1-10 ksi (1000-10,000 psi), to sinter the layers. Each layer of the electrolyte has a thickness of 0.025- 0.1 mm (0.001-0.004 inches) (thus layer with thickness less than 0.03 inches) and the electrolyte has an overall thickness of 0.1-0.5 mm (0.004-0.2 inches) (thus component with thickness encompassing the claimed range of 0.01-0.03 inches) (col. 4-9).

(5)

Claims 13-15, 17, 19, 21, 23, 25 and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 5-101838.

JP 5-101838 discloses a method of making an interconnector for a solid electrolyte fuel cell comprising: forming a thin film of lanthanum chromate by tape-casting; sintering the thin film to a density of 95% or more of theoretical density; heating the sintered thin film under weight of a flat plate (heat and pressure after sintering) to flatten the thin film; and coating the sintered thin film with a slurry for bonding to a sintered compact. The interconnector thin film has thickness of 5-200 μm (0.0002-0.008 inches) (less than 0.03 inches as claimed in Claim 27) (Abstract and computer translation).

(6)

Claims 13-15 and 18-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Kolker et al. 5,898,008.

Kolker et al. 5,898,008 disclose a method of making a pore free sintered silicon carbide body for a hard disk comprising: tape casting a green body of silicon carbide powder; and converting the green body into a dense sintered body by hot pressing. For making a hard disk, a disk is sawed from the sintered body and sputtered (coated) with magnetic layers (col. 1-4).

(7)

Claims 1 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Kwon et al. 2005/0019636.

Kwon et al. disclose a method of making a solid oxide fuel cell comprising: forming anode, electrolyte and cathode layers of by tape-casting ceramic; and heat-treating the layers together by pressure sintering such as hot pressing [0038]-[0040], [0051].

Kwon et al. has priority to Provisional application No. 60/477,149 filed 6/9/2003. Provisional application No 60/403,218 filed 8/13/2002 from which the present application has priority does not support claims directed to laminating tapes and hot pressing.

Claim Rejections - 35 USC § 103

(8)

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

(9)

Claims 2, 3 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minh et al. 5,290,642 as applied to claims 1 and 23, and further in view of Simpkins et al. 2002/0081475.

Simpkins et al. 2002/0081475 teaches that in a solid oxide fuel cell, the interconnects can comprise materials such chromium and lanthanum chromite as well as combinations of the materials [0034].

It would have been obvious to one of ordinary skill in the art to have modified the

method of Minh et al. by forming the tape for the interconnect from a combination of lanthanum chromite powder and chromium powder, as taught by Simpkins et al, as an alternative to lanthanum chromite for an interconnect for a fuel cell. The use of chromium and lanthanum chromite in combination for making the interconnect would have been obvious to one of ordinary skill in the art as an alternative to just lanthanum chromite, as taught by Simpkins et al., and thus the slurry for the interconnect comprises a powder or material comprising at least 95% chromium, as claimed.

(10)

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Minh et al. 5,290,642 as applied to claim 1, and further in view of Olsen et al. 2004/0017028.

Olsen et al. teach that in making a solid oxide fuel cell by assembling and sintering layers, narrow tolerance with maximum tolerance of 1% can be achieved by shaping the fuel cell after sintering using various cutting tools [0005]-[0010].

It would have been obvious to one of ordinary skill in the art to have modified the method of Minh et al. by also shaping the solid oxide fuel cell core after heat treating to sinter and fully densify, as taught by Olsen et al., to achieve a solid oxide fuel cell of narrow tolerance with maximum tolerance of 1%.

Olsen et al. has a filing date of 5/12/2003. Provisional application No 60/403,218 filed 8/13/2002 from which the present application has priority does not support a claim directed to trimming the sintered structure.

(11)

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Minh et al. 5,290,642 as applied to claim 13, and further in view of Kotchick et al. 4,913,982.

Kotchick et al. 4,913,982 teach that in making a solid oxide fuel cell core by laminating and sintering tapes, the interconnect and electrolyte material undergo densification to 94-99% of theoretical density, thereby forming a gas tight barrier (col. 10, lines 4-7).

It would have been obvious to one of ordinary skill in the art to have sintered and fully densified the lanthanum chromite interconnect of the assembly of Minh et al. to a density of 94-99% of theoretical density, encompassing at least 96%, as taught by Kotchick et al., to form a gas tight barrier.

(12)

Claims 1 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over McPheeters et al. 5,882,809 in view of either Minh et al. or Kwon et al. 2005/0019636.

McPheeters et al. disclose a method of making a solid oxide fuel cell comprising: providing tape-cast sheets; laminating the sheets to form a single cell unit comprising three parallel sheets separated by two corrugated sheets; sintering at high temperature to fuse the component materials together into a finished subassembly; painting or spraying a conductive material on either or both end surfaces of the single cell unit (coating the sintered structure with a compound); and stacking and connecting single cell units in electrical series (col. 4-7). McPheeters does not disclose applying pressure during sintering (hot pressing).

Minh et al. teach that in making a solid oxide fuel cell by laminating and sintering tapes, compressive force is applied to promote contact and interbonding at the adjacent surfaces (col.

8, lines 41-42).

Kwon et al. teach that in making a solid oxide fuel cell by sintering tape-cast layers, pressure-sintering such as hot pressing is preferred over pressureless sintering [0035].

It would have been obvious to one of ordinary skill in the art to have modified the method of McPheeters et al. by sintering the laminated tape-cast sheets by applying pressure during sintering, as taught by Minh et al., to promote contact and interbonding at the adjacent surfaces, or as taught by Known et al, as preferred over pressureless sintering.

(13)

Claims 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minh et al. 5,290,642 in view of JP 9-190829.

Minh et al. 5,290,642 discloses a method of making a solid oxide fuel cell core (component of an electrochemical converter) comprising: casting a tape from a slurry of lanthanum chromite powder for an interconnect; casting a tape from a slurry of zirconia powder for an electrolyte; laminating the tapes with cathode and anode tapes; cutting the tapes into laminates; sintering to partially densify; laminating the sintered and densified components to form a stacked assembly; and heat treating to sinter and fully densify the assembly using a compressive force during sintering and densifying to promote contact and interbonding, the heat treating to sinter and densify being at temperature of 1000-1400°C. The interconnect and electrolyte layers are thin (0.002-0.005 cm) (0.0008-0.002 inches) (thus layers with thickness less than 0.03 inches) while the cathode and anode layers have thickness of 0.002-0.05 cm (0.0008-0.02 inches) (thus component with thickness encompassing the range of 0.01-0.03 inches). The tape for the interconnect is planar (flat) while other tapes are corrugated (col. 6-8).

Minh et al. do not disclose providing the interconnect as a combination of lanthanum chromite layer and chromium layer.

JP 9-190829 teaches that a lanthanum chromite separator of a fuel cell is provided with a metal material layer such as chromium such as by sticking a metallic foil to provide the lanthanum chromite with stability in reducing atmosphere.

It would have been obvious to one of ordinary skill in the art to have modified the method of Minh et al. for making a fuel cell core by laminating a chromium foil to the lanthanum chromite tape, as taught by JP 9-190829, to provide the lanthanum chromite interconnect with stability in reducing atmosphere. By laminating a metallic chromium foil to the lanthanum chromite tape and heating treating the assembly to form the fuel cell, an interconnect comprising a first layer of at least 95% chromium and a second layer of lanthanum chromite formed by laminating and hot pressing is obviously formed.

(14)

Claims 21, 23, 25 and 26 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Krumpelt et al. 6,843,960.

Krumpelt et al. disclose an interconnect for a solid oxide fuel cell, the interconnect fabricated by forming a layer from a slip comprised of alloy powder and sintering the layer, the interconnect fabricated to have flat surfaces or textured surfaces to serve as flow channels for the solid oxide fuel cell (col. 2-6).

Further, by forming the layer from a slip and sintering the layer to form an interconnect have flat surfaces or a textured surface, an interconnector plate (component) for an electrochemical converter and having flat surfaces or textured surfaces is obviously provided.

In the event any differences can be shown for the product of the product-by-process claims, as opposed to the product taught by the reference, such differences would have been obvious to one of ordinary skill in the art as a routine modification of the product in the absence of a showing of unexpected results; see also In re Thorpe, 227 USPQ 964 (CAFC 1985).

When the prior art discloses a product which reasonably appears to be either identical with or only slightly different than a product claimed in a product-by-process claim, a rejection based alternatively on either section 102 or 103 of the statute is appropriate. As a practical matter, the Patent and Trademark Office is not equipped to manufacture products by the myriad of processes put before it and then obtain prior art products and make physical comparisons therewith. A lesser burden of proof is required to make out a case of prima facie obviousness for product-by-process claims because of their particular nature than when a product is claimed in the conventional fashion. *In re Brown*, 59 CCPA 1063, 173 USPQ 685 (1972); *In re Fessmann*, 180 USPQ 324 (CCPA 1974).

Conclusion

(15)

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The references disclose methods of making solid oxide fuel cells.

(16)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melvin Curtis Mayes whose telephone number is 571-272-1234. The examiner can normally be reached on Mon-Fri 7:30 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chris Fiorilla can be reached on 571-272-1187. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Melvin Curtis Mayes
Primary Examiner
Art Unit 1734

MCM
March 22, 2007